

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 04-223871

(43)Date of publication of application : 13.08.1992

(51)Int.Cl.

B24D 3/06

B24D 3/00

B24D 7/00

(21)Application number : 02-414521

(71)Applicant : NIPPON ALUM CO LTD
SANWA KENMA KOGYO KK

(22)Date of filing : 25.12.1990

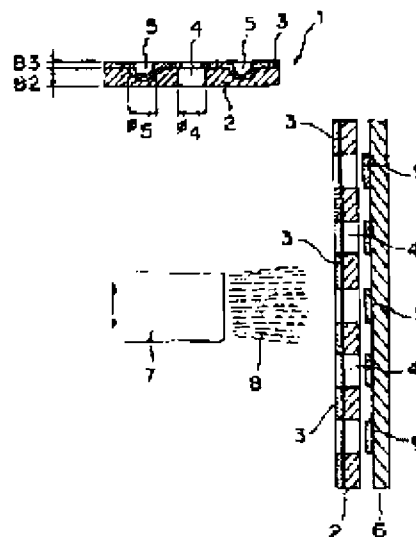
(72)Inventor : MATSUMOTO SHIRO
NOMURA HARUKI

(54) DIAMOND GRINDING WHEEL AND MANUFACTURE THEREOF

(57)Abstract:

PURPOSE: To provide a grinding wheel excellent in a grinding efficiency, by forming a thermal sprayed abrasive grain layer that the diamond abrasive grain subjected to a metal coating is held with its dispersion in a metal binder, excepting the part of holes, on the shoe provided with holes and recesses.

CONSTITUTION: A mixing power 8 mixed with the diamond abrasive grain subjected to a metal coating and a metal binding powder is subjected to a plasma spraying, in the state of a separate shoe 6 being superposed at the opposite side, onto the shoe 2 provided with a hole 4 and recess 5. Consequently a thermal spray abrasive grain layer 3 that the diamond abrasive grain subjected to a metal coating is held with its dispersion in a metal binder is formed, excepting the part of the hole 4, and a desired diamond grinding wheel 1 is obtained.



**ENGLISH TRANSLATION OF JAPANESE PATENT KOKOKU PUBLICATION
No. JP4-223871A (Ref.2)**

DIAMOND GRINDING WHEEL AND MANUFACTURE THEREOF

1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. **** shows the word which can not be translated.

3. In the drawings, any words are not translated.

[Claim 1] In a diamond wheel by which a thermal-spraying abrasive grain layer which carries out thermal spraying of the mixed powder which mixes a diamond abrasive grain which carried out metallic coating, and metallic bond agent powder is formed in the base metal surface, A diamond wheel currently forming in the base metal surface which it extracts, and dents not only on a hole but on the base metal surface, a hole is also established in base metal, and a thermal-spraying abrasive grain layer extracted, and also includes dent holes other than a hole.

[Claim 2] In a manufacturing method of a diamond wheel which carries out thermal spraying of the mixed powder which mixes a diamond abrasive grain which carried out metallic coating, and metallic bond agent powder to the surface of the 1st base metal that extracted and provided a hole, and forms a thermal-spraying abrasive grain layer in it, Arrange, where the 2nd base metal that is a different body is piled up, carry out the plasma metal spray of the above-mentioned mixed powder from the surface side of the 1st base metal of the above, extract on the surface of the 1st base metal of the above, and form a thermal-spraying abrasive grain layer in the rear-face side of the 1st base metal of the above except for a portion of a hole, and. A manufacturing method of a diamond wheel obtaining simultaneously a diamond wheel which formed a thermal-spraying abrasive grain layer also in a portion which the 1st base metal of the above of the surface of the 2nd base metal of the above extracted, and countered a hole, and was provided with the 1st base metal of the above by it, and a diamond wheel provided with the 2nd base metal of the above.

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a diamond wheel used for the grinding stone for stone camfering, the grinding stone for edged tools, a lapping machine, etc., and a manufacturing method for the same.

[0002]

[Description of the Prior Art] For example, the diamond wheel of the disk type which carried out adherence maintenance of the diamond abrasive grain with the metal-bond method or the electrodeposition process is used for the grinding stone for stone camfering on the base metal surface. Generally, in the grinding stone for unscrapable materials, when raising the grinding performance of a grinding stone, it becomes important to raise the cooling power of a grinding side and to promote the escape of grinding waste. For this reason, a cooling puddle is made and the duty in which existence of the stoma (chip pocket) which forms the refuge place of grinding waste is very important is achieved.

[0003]

[Problem(s) to be Solved by the Invention] Then, establishing an omission hole in base metal beforehand in some places, and forming an abrasive grain layer with a hole a punching metal, nothing, and on this as a policy which gives a chip pocket positively to a diamond wheel, is proposed. When it does in this way, the effect that it extracts, the portion of a hole plays and extracts the role of a macroscopic chip pocket, and grinding efficiency increases according to the edge effect by ejection of the abrasive grain of the circumference of a hole is expected.

[0004] However, in order for forming an abrasive grain layer in such the base metal surface with a hole by equivalent thickness to maintain intensity difficult technically and also fixed to base metal, it extracts and there is a limit also in the numerical aperture of a hole naturally.

[0005]Extract this invention to base metal, dent with a hole, and provide a hole, and by combining the means forming of the abrasive grain layer by thermal spraying with this, The diamond wheel which carries out a chip pocket substantially and can increase the numerical aperture of the functioning base metal further newly tends to be used as an offer plug, and it is going to provide also about the suitable manufacturing method collectively.

[0006]

[Means for Solving the Problem]In a diamond wheel in which a thermal-spraying abrasive grain layer which carries out thermal spraying of the mixed powder which mixes a diamond abrasive grain the invention according to claim 1 of carried out metallic coating to the base metal surface, and metallic bond agent powder is formed, It extracts, and dents not only on a hole but on the base metal surface, a hole is also established in base metal, and a thermal-spraying abrasive grain layer is characterized by being formed in the base metal surface which extracted and also includes dent holes other than a hole.

[0007]In a manufacturing method of a diamond wheel which carries out thermal spraying of the mixed powder which mixes a diamond abrasive grain which carried out metallic coating, and metallic bond agent powder to the surface of the 1st base metal that extracted the invention according to claim 2 and provided a hole, and forms a thermal-spraying abrasive grain layer in it, Arrange, where the 2nd base metal that is a different body is piled up, carry out the plasma metal spray of the above-mentioned mixed powder from the surface side of the 1st base metal of the above, extract on the surface of the 1st base metal of the above, and form a thermal-spraying abrasive grain layer in the rear-face side of the 1st base metal of the above except for a portion of a hole, and. A thermal-spraying abrasive grain layer is formed also in a portion which the 1st base metal of the above of the surface of the 2nd base metal of the above extracted, and countered a hole, and it is characterized by obtaining simultaneously a diamond wheel provided with the 1st base metal of the above by it, and a diamond wheel provided with the 2nd base metal of the above.

[0008]

[Function]In the diamond wheel by this invention, extract to base metal, dent with a hole, and a hole is provided, and covering formation of the thermal-spraying abrasive grain layer which is dented in a dent hole, imitates shape and carries out distributed maintenance of the diamond abrasive grain is carried out uniformly. And a role of a chip pocket which the portion of each dent hole stores cooling water, or misses grinding waste in the grinding stone which puts this dent hole side by side is played, The edge effect by ejection of the abrasive grain of the circumference of a dent hole is also revealed, and the effect same with having extracted holding base metal intensity and having doubled the numerical aperture of the hole substantially is acquired.

[0009]If a thermal-spraying abrasive grain layer is formed by a plasma metal spray on the base metal which according to the manufacturing method of this invention extracted and provided the hole, It will extract also on the base metal of the different body simultaneously laid on top of the opposite hand, and a thermal-spraying abrasive grain layer will be formed through the portion of a hole, and can avoid useless consumption of a diamond abrasive grain, and. A thermal-spraying abrasive grain layer is simultaneously formed in the base metal which extracts and has a hole, and the base metal of the different body by which thermal spraying is carried out by using this base metal as a mask.

[0010]

[Example]Hereafter, an example is illustrated and described.

[0011]The example of the diamond wheel concerning this invention is shown in drawing 1 and drawing 2.

[0012]In the figure, 1 shows a disk-like diamond wheel and the thermal-spraying abrasive grain layer 3 is formed by almost equivalent thickness on the metal base metal 2, such as iron and an aluminum alloy. In the case of a typical operation article, it is formed in thickness B-2;1-2mm of the base metal 2, and building-up thickness B3;0.5-1mm of the abrasive grain layer 3.

[0013]Beforehand, distribute the above-mentioned base metal 2 radiately on the circumference, extract to it by press working of sheet metal etc., and the hole 4 is drilled in it with the proper numerical aperture, and it keeps adjoining and the dent hole 5 of sphere form is alternately

established in the position between the holes 4 and 4 by machining by a ball end mill etc.

[0014]It extracted and, of course, the abrasive grain layer 3 is missing about the portion of the hole 4. On the other hand, about the portion of the dent hole 5, the dent shape is imitated and the abrasive grain layer 3 is formed by the surface of the base metal 2, and almost equivalent thickness. In the case of a typical operation article, it extracts and is the bore diameter $\phi 4$; It is provided in equal diameter size (3.5 mm and dent bore-diameter $\phi 5$; 3.5mm). But since covering formation of the abrasive grain layer 3 is carried out also at the edge of each dent hole 5 after forming the thermal-spraying abrasive grain layer 3, the size of the exterior dent hole 5 will be extracted and will appear a little smaller than the size of the hole 4.

[0015]The thermal-spraying abrasive grain layer 3 which extracts and is formed in the surface of the base metal 2 almost uniformly except for the portion of the hole 4, Diamond abrasive grains (not shown) which carried out metallic coating, such as nickel and Cu, It is the thing made to distribute and hold to metallic bond agents (or the aggregate abrasive grain of oxide powder, such as carbide, such as WC and SiC, and alumina, may be included if needed), such as nickel, Co, Cu, Cu-Sn, and W, The wettability (holding power) of the metal bond of the thermal-spraying abrasive grain layer to a diamond abrasive grain is good, the adhesion over the base metal of a thermal-spraying abrasive grain layer is high, moreover, to each dent hole 5, the dent shape is imitated and there are the features, like covering formation can be carried out uniformly.

[0016]About the means forming of this thermal-spraying abrasive grain layer, a full account is given in Japanese Patent Application No. No. 274414 [two to], and the example about a next manufacturing method.

[0017]Extract to the base metal 2 which extracted in this way, was dented with the hole 4, and formed the hole 5, and the portion of the hole 4 is removed to it, If it is in the diamond wheel 1 in which the thermal-spraying abrasive grain layer 3 which made the diamond abrasive grain which carried out metallic coating distribute and hold to a metallic bond agent was formed, it extracts, dents in the chip-pocket formation effect of the hole 4, and is superimposed on the chip-pocket formation effect by the hole 5, and cooling water collects by this, a function, the excretory function of grinding waste, and the planar pressure potentiation extract further and according to the edge effect around the hole 4 and the dent hole 5 are added, and the characteristic which was dramatically excellent in grinding efficiency is demonstrated. and -- extracting and extracting by denting with the hole 4 and putting the hole 5 side by side -- the hole 4 -- if independent, the high numerical aperture almost covering all the surfaces of the impossible base metal 2 is given -- things can be carried out.

[0018]Next, the example of the manufacturing method of the above-mentioned diamond wheel is described.

[0019]If a numerical aperture is large when forming a thermal-spraying abrasive grain layer in the base metal which extracted and provided the hole, the fault to which the loss which the diamond abrasive grain sprayed with mixed powder with metallic bond agent powder on base metal from a thermal spraying gun extracts, and carries out fly off vainly through the portion of a hole becomes large will be accepted. Then, it masks by the base metal which piled up and extracted the base metal of the different body to the opposite hand of the base metal which extracted and provided the hole, and established the hole in it, and the method of forming a thermal-spraying abrasive grain layer simultaneously on the base metal of one more sheet is proposed.

[0020]To the base metal 2 (the 1st base metal; application is possible also when it does not have the dent hole 5) which shows and extracts the outline of this manufacturing method and has the hole 4 and the dent hole 5 of a graphic display abbreviation, drawing 3. The base metal 6 (the 2nd base metal) of a different body is laid on top of an abrasive grain layer forming face and an opposite hand, and the padding of the abrasive grain layer 3 by a plasma metal spray is performed from the thermal spraying gun 7 in this state.

[0021]From the thermal spraying gun 7, the plasma metal spray of the mixed powder 8 which mixed metallic bond agent powder etc. with the diamond abrasive grain which carried out metallic coating is carried out so that ground treatment, such as a blast, may be performed beforehand and each piled-up abrasive grain layer forming face of the base metal 2 and the base metal 6 may be indicated by Japanese Patent Application No. No. 274414 [two to]. Under the

present circumstances, reciprocation moving of the thermal spraying gun 7 is carried out like a graphic display arrow, and on the base metal 2, the thermal-spraying abrasive grain layer 3 is formed uniformly, and it goes.

[0022]The thermal-spraying abrasive grain layer 3 which made the diamond abrasive grain distribute and hold at a metallic bond agent in thickness almost uniform throughout extracting and the portion of the dent hole 5 being included except for the portion of the hole 4 on the base metal 2 in this way then is formed, On the other hand, mask thermal spraying which uses the base metal 2 as a mask will be performed also on the base metal 6 which polymerized in the opposite hand. That is, the base metal 2 extracts and the thermal-spraying abrasive grain layer 9 is similarly formed by the dispersion state corresponding to the portion of the hole 4.

[0023]Drawing 4 and drawing 5 show the correspondence relation between the thermal-spraying abrasive grain layer 3 formed on the base metal 2, and the thermal-spraying abrasive grain layer 9 which carries out the mask of this base metal 2, and is formed on the base metal 6.

[0024]Namely, to the base metal 2 by the side of the surface which serves as a mask. The thermal-spraying abrasive grain layer 3 is formed in the whole region which it extracts, and the hole 4 removes and includes the dent hole 5 which is not illustrated by desired thickness, on the other hand, the base metal 2 extracts, the mask base metal 2 extracts to the base metal 6 by the side of a rear face, and the thermal-spraying abrasive grain layer 9 of the mixed powder 8 which passes the portion of the hole 4 and is laminated is formed in it by the dispersion state corresponding to distribution of the hole 4.

[0025]Therefore, the futility of a diamond abrasive grain which it extracts at the time of forming the thermal-spraying abrasive grain layer 3 in the base metal 2 which extracted and formed the hole 4 if this manufacturing method is followed, and passes through the hole 4 is lost, And the diamond wheel which formed the thermal-spraying abrasive grain layer 9 selectively as a mask can manufacture simultaneously the diamond wheel which formed the thermal-spraying abrasive grain layer 3 in the base metal 2 which extracts and has the hole 4 extensively, and the base metal 2.

[0026]About the grinding stone of the latter obtained by the above-mentioned process, since each abrasive grain layer 9 is distributing independently, it is checked that the characteristic that especially an edge effect is large is accepted, for example, grinding performance very excellent in the use of the high heavy duty grinding of planar pressure is shown.

[0027]Drawing 6 illustrates the application product of this new style grinding stone, and he is trying to embed the crevice between the thermal-spraying abrasive grain layers 9 by which distributed formation is carried out at intervals on the base metal 6 almost flat-tapped in the dressing layer 10 which consists of a mixed layer of green silicon carbide (green carbon) and resin, for example. If it does in this way, a diamond wheel with dressing material with large grinding efficiency can newly create.

[0028]

[Effect of the Invention]As mentioned above, in the diamond wheel of this invention. In order to form the thermal-spraying abrasive grain layer which made the diamond abrasive grain which was extracted to the base metal which extracted, was dented with the hole and provided the hole, and carried out metallic coating to it except for the portion of a hole distribute and hold to a metallic bond agent, It extracts, and dents with a hole, the chip-pocket formation effect by a hole is revealed synergistically, and the grinding stone which was dramatically excellent in grinding efficiency is realized.

[0029]Since the technique of mask thermal spraying which carries out thermal spraying where the base metal of a different body is laid on top of an opposite hand is adopted on the base metal which extracted and provided the hole according to the manufacturing method of this invention, It can carry out without the loss of a diamond abrasive grain with expensive formation of the thermal-spraying abrasive grain layer to the base metal which extracts and has a hole, and, moreover, this new useful diamond wheel of one more sheet that extracted, and the thermal-spraying abrasive grain layer distributed and was formed on base metal with the diamond wheel with a hole can manufacture simultaneously.

[Brief Description of the Drawings]

A drawing shows the example of this invention.

[Drawing 1] It is a top view of the diamond wheel which extracted and provided the hole and the dent hole.

[Drawing 2] It is an A-A line sectional view of drawing 1.

[Drawing 3] It is a sectional view showing the example of a manufacturing method.

[Drawing 4] It is the partial section and top view of the diamond wheel which extracted and provided the hole.

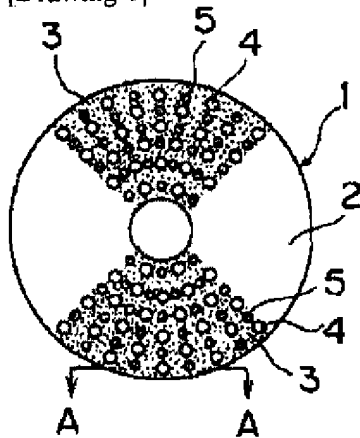
[Drawing 5] It is the partial section and top view of a diamond wheel which were manufactured by mask thermal spraying.

[Drawing 6] It is a sectional view showing the application product of the diamond wheel manufactured by mask thermal spraying.

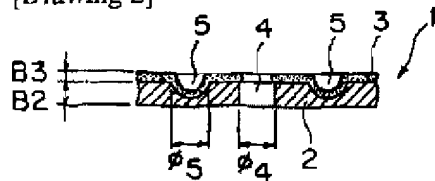
[Description of Notations]

- 1 Diamond wheel
- 2 Base metal
- 3 Thermal-spraying abrasive grain layer
- 4 Extract and it is a hole.
- 5 Dent hole
- 6 Base metal
- 7 Thermal spraying gun
- 8 Thermal-spraying mixed powder
- 9 Thermal-spraying abrasive grain layer
- 10 Dressing layer

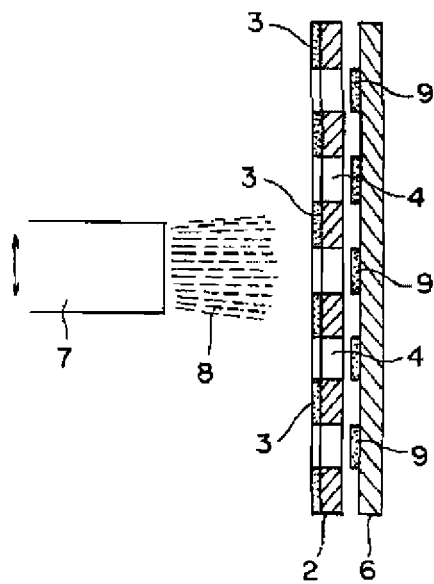
[Drawing 1]



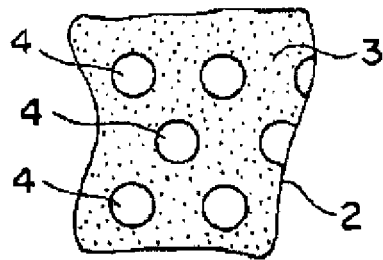
[Drawing 2]



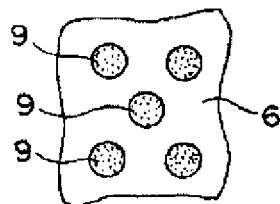
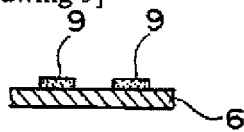
[Drawing 3]



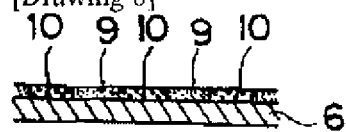
[Drawing 4]



[Drawing 5]



[Drawing 6]



(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平4-223871

(43) 公開日 平成4年(1992)8月13日

(51) Int.Cl. ⁵	識別記号	庁内整理番号	F I	技術表示箇所
B 2 4 D	3/06	D 8813-3C		
	3/00	3 3 0 D 8813-3C		
	7/00	P 8813-3C		

審査請求 未請求 請求項の数 2 (全 4 頁)

(21) 出願番号 特願平2-414521

(22) 出願日 平成2年(1990)12月25日

(71) 出願人 000004732

株式会社日本アルミ

大阪府大阪市淀川区三国本町3丁目9番39号

(71) 出願人 390011785

三和研磨工業株式会社

京都府宇治市大久保町上ノ山22-1

(72) 発明者 松本 史朗

大阪府淀川区三津屋北2丁目15番28号 日本アルミニウム工業株式会社内

(72) 発明者 野村 治樹

京都府宇治市大久保町上ノ山22の1 三和研磨工業株式会社内

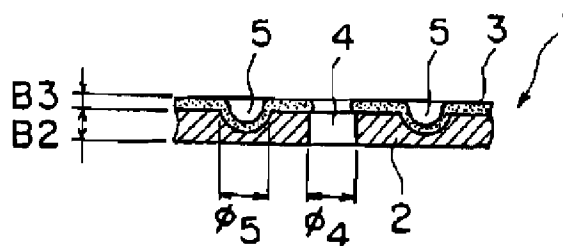
(74) 代理人 弁理士 西谷 英雄

(54) 【発明の名称】 ダイヤモンド砥石及びその製造方法

(57) 【要約】

【目的】 チップポケットに富んだ高性能のダイヤモンド砥石を、その好適な製造方法と共に創出する。

【構成】 ダイヤモンド砥石として、抜き穴と凹み穴とを設けた台金に、抜き穴の部分を除いて、金属コーティングしたダイヤモンド砥粒を金属結合剤に分散して保持させた溶射砥粒層を形成する。また、その製造方法として、抜き穴を設けた台金の上に、反対側に別体の台金を重ね合わせた状態で、マスクプラズマ溶射を適用する。



【特許請求の範囲】

【請求項1】 抜き穴と凹み穴とを設けた台金に、抜き穴の部分を除いて、金属コーティングしたダイヤモンド砥粒を金属結合剤に分散して保持させた溶射砥粒層を形成したことを特徴とするダイヤモンド砥石。

【請求項2】 抜き穴を設けた台金の上に、反対側に別体の台金を重ね合わせた状態で、金属コーティングしたダイヤモンド砥粒と金属結合剤粉末とを混合した混合粉をプラズマ溶射して、抜き穴の部分を除いて、金属コーティングしたダイヤモンド砥粒を金属結合剤に分散して保持させた溶射砥粒層を形成することを特徴とするダイヤモンド砥石の製造方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、石材面取り用砥石、刃物用砥石、ラップ盤等に利用されるダイヤモンド砥石及びその製造方法に関する。

【0002】

【従来の技術】 例えば、石材面取り用砥石には、台金表面にメタルボンド法や電着法によりダイヤモンド砥粒を固着保持させたディスクタイプのダイヤモンド砥石が用いられている。一般に、難削材用の砥石では、砥石の研削性能をアップする上で、研削面の冷却能を高め研削屑の逃げを促進することが肝要となる。このため、冷却水溜りを作り出し、研削屑の逃げ場所を形成する気孔（チップポケット）の存在が非常に重要な役目を果たす。

【0003】

【発明が解決しようとする課題】 そこで、ダイヤモンド砥石にチップポケットを積極的に付与する方策として、予め台金に所々抜き穴を設けてパンチングメタルとなし、この上に穴付きの砥粒層を形成することが提案される。このようにすると、抜き穴の部分がマクロなチップポケットの役割を果し、また、抜き穴周囲の砥粒の突き出しによるエッジ効果によって研削能率が増大する効果が期待される。

【0004】 しかしながら、このような穴付きの台金表面に均等な厚みで砥粒層を形成することが技術的に困難である上に、台金に一定の強度を維持するためには、抜き穴の開孔率にも自ずと限界がある。

【0005】 本発明は、台金に抜き穴と共に凹み穴を設けると共に、これに溶射による砥粒層の形成手段を組み合わせることで、実質的にチップポケットして機能する台金の開孔率を更に増大できるダイヤモンド砥石を新たに提供せんとするものであり、併せてその好適な製造方法についても提供せんとしている。

【0006】

【課題を解決するための手段】 即ち、本発明に係るダイヤモンド砥石は、抜き穴と凹み穴とを設けた台金に、抜き穴の部分を除いて、金属コーティングしたダイヤモンド砥粒を金属結合剤に分散して保持させた溶射砥粒層を

形成したものからなっている。

【0007】 また、このダイヤモンド砥石の製造方法として、抜き穴を設けた台金の上に、反対側に別体の台金を重ね合わせた状態で、金属コーティングしたダイヤモンド砥粒と金属結合剤粉末とを混合した混合粉をプラズマ溶射して、抜き穴の部分を除いて、金属コーティングしたダイヤモンド砥粒を金属結合剤に分散して保持させた溶射砥粒層を形成する方法を採用している。

【0008】

【作用】 本発明によるダイヤモンド砥石では、台金に抜き穴と凹み穴とが設けられると共に、凹み穴には凹み形状に倣ってダイヤモンド砥粒を分散保持する溶射砥粒層が均一に被覆形成される。そして、この凹み穴を併設する砥石では、各凹み穴の部分が冷却水を貯溜し或いは研削屑を逃がすチップポケットとしての役割を果し、更に凹み穴周囲の砥粒の突き出しによるエッジ効果も発現されて、台金強度を保持しつつ抜き穴の開孔率を実質的に倍増したのと同様の効果が得られる。

【0009】 また、本発明の製造方法によると、抜き穴を設けた台金の上に、プラズマ溶射により溶射砥粒層を形成すると、同時に反対側に重ね合わされた別体の台金上にも抜き穴の部分を通して溶射砥粒層が形成されることになり、ダイヤモンド砥粒の無駄な消費が回避できると共に、抜き穴を有する台金と、この台金をマスクとして溶射される別体の台金とに同時に溶射砥粒層が形成されるものとなる。

【0010】

【実施例】 以下、実施例を図示して説明する。

【0011】 図1と図2には、本発明に係るダイヤモンド砥石の具体例が示されている。

【0012】 図において、1はディスク状のダイヤモンド砥石を示し、鉄、アルミニウム合金等の金属製台金2の上に、ほぼ均等な厚みで溶射砥粒層3が形成されている。代表的な実施品の場合、台金2の肉厚B2；1～2mm、砥粒層3の肉盛厚B3；0.5～1mmに形成される。

【0013】 上記台金2には、予めプレス加工等により、円周上に放射状に分布させて、抜き穴4が適宜の開孔率で穿設されていると共に、隣接する抜き穴4、4間の位置には、ボールエンドミル等による機械加工によって、球面状の凹み穴5が千鳥状に設けられている。

【0014】 抜き穴4の部分については、勿論砥粒層3が欠落している。これに対して、凹み穴5の部分については、その凹み形状に倣って台金2の表面とほぼ均等な厚みで砥粒層3が形成されている。代表的な実施品の場合、抜き穴径φ4；3.5mm、凹み穴径φ5；3.5mmの同径サイズに設けられる。もっとも、溶射砥粒層3を形成した後では、各凹み穴5のエッジにも砥粒層3が被覆形成されるため、外觀上凹み穴5のサイズは抜き穴4のサイズよりも幾分小さく現われることになる。

【0015】 抜き穴4の部分を除いて、台金2の表面に

ほぼ均等に形成される溶射砥粒層3は、Ni、Cu等の金属コーティングしたダイヤモンド砥粒（図示されず）を、Ni、Co、Cu、Cu-Sn、W等の金属結合剤（或いは必要に応じてWC、SiC等の炭化物やアルミナ等の酸化物粉末の骨材砥粒を含む場合がある）に分散して保持させたもので、ダイヤモンド砥粒に対する溶射砥粒層のメタルボンドの濡れ性（保持力）が良好で、溶射砥粒層の台金に対する密着性が高く、しかも各凹み穴5に対して、その凹み形状に倣って均一に被覆形成できるなどの特徴がある。

【0016】なお、この溶射砥粒層の形成手段については、特願平2-274414号及び後の製造方法に関する実施例で詳記される。

【0017】このように抜き穴4と凹み穴5とを設けた台金2に、抜き穴4の部分を除き、金属コーティングしたダイヤモンド砥粒を金属結合剤に分散して保持させた溶射砥粒層3を形成したダイヤモンド砥石1にあっては、抜き穴4のチップポケット形成効果に凹み穴5によるチップポケット形成効果が重畳され、これにより冷却水の溜まり機能や研削屑の排出機能、更には抜き穴4及び凹み穴5の周囲のエッジ効果による面圧増強作用が加わって、非常に研削能率の優れた特性が発揮される。しかも、抜き穴4と凹み穴5とを併設することで、抜き穴4単独では不可能な台金2のほぼ全表面に亘る高い開口率を付与することできる。

【0018】次に、上記ダイヤモンド砥石の製造方法の実施例について説明する。

【0019】抜き穴を設けた台金に溶射砥粒層を形成する場合、開口率が大きいと、溶射ガンから台金上に金属結合剤粉末との混合粉で噴き付けられるダイヤモンド砥粒が抜き穴の部分を通して無駄に逸散してしまうロスが大きくなる不具合が認められる。そこで、抜き穴を設けた台金の反対側に別体の台金を重ね合わせて、抜き穴を設けた台金でマスキングして、もう一枚の台金上に同時に溶射砥粒層を形成する方法が提案される。

【0020】図3は、この製造方法の概要を示し、抜き穴4と図示省略の凹み穴5とを有する台金2（凹み穴5を有しない場合も適用可）には、砥粒層形成面と反対側に別体の台金6を重ね合わせ、この状態で溶射ガン7からプラズマ溶射による砥粒層3の肉盛りが行われる。

【0021】重ね合わされた台金2及び台金6の各砥粒層形成面は、予めブラスト等の下地処理が行われると共に、特願平2-274414号に開示されるように、溶射ガン7からは金属コーティングしたダイヤモンド砥粒と金属結合剤粉末等とを混合した混合粉8がプラズマ溶射される。この際、溶射ガン7を図示矢印のように往復移動して、台金2上に均等に溶射砥粒層3を形成して行く。

【0022】このようにすると、台金2上には、抜き穴4の部分を除いて、凹み穴5の部分を含む全域にほぼ均一

な厚さにダイヤモンド砥粒を金属結合剤に分散して保持させた溶射砥粒層3が形成され、他方、反対側に重合された台金6上にも、台金2をマスクとするマスク溶射が行われることになる。即ち、台金2の抜き穴4の部分に対応する分散状態で同様に溶射砥粒層9が形成される。

【0023】図4と図5は、台金2上に形成される溶射砥粒層3と、該台金2をマスクして台金6上に形成される溶射砥粒層9との対応関係を示している。

【0024】すなわち、マスクを兼ねる表面側の台金2には、抜き穴4の除いて、図示しない凹み穴5を含む全域に溶射砥粒層3が所望の厚みで形成され、一方、裏面側の台金6には、台金2の抜き穴4の部分を通して積層される混合粉8の溶射砥粒層9が、マスク台金2の抜き穴4の分布に対応した分散状態で形成されるものとなる。

【0025】従って、この製造方法に従えば、抜き穴4を設けた台金2に溶射砥粒層3を形成する際の抜き穴4を通過するダイヤモンド砥粒の無駄がなくなり、しかも抜き穴4を有する台金2に全面的に溶射砥粒層3を形成したダイヤモンド砥石と、台金2をマスクとして部分的に溶射砥粒層9を形成したダイヤモンド砥石とが同時に製造できるものとなる。

【0026】なお、上記製法で得られる後者の砥石については、各砥粒層9が独立して分散しているため、特にエッジ効果が大きいという特性が認められ、例えば面圧の高い重研削の用途などにはすこぶる優秀な研削性能を示すことが確認されている。

【0027】図6は、この新型砥石の応用製品を図示し、台金6上に飛び飛びに分散形成されている溶射砥粒層9の隙間を、例えばGC砥粒（グリーンカーボン）と樹脂との混合層からなるドレッシング層10でほぼ面一に埋め込むようにしている。このようにすると、研削能率の大きいドレッシング材付きのダイヤモンド砥石が新たに創出できる。

【0028】

【発明の効果】以上のように、本発明のダイヤモンド砥石では、抜き穴と凹み穴とを設けた台金に、抜き穴の部分を除いて、金属コーティングしたダイヤモンド砥粒を金属結合剤に分散して保持させた溶射砥粒層を形成したものであるため、抜き穴と凹み穴とによるチップポケット形成効果が相乗的に発現され、非常に研削能率に優れた砥石が実現される。

【0029】また、本発明の製造方法によれば、抜き穴を設けた台金の上に、反対側に別体の台金を重ね合わせた状態で溶射するマスク溶射の手法を採用しているため、抜き穴を有する台金に対する溶射砥粒層の形成が高価なダイヤモンド砥粒のロスなく行え、しかもこの抜き穴付きのダイヤモンド砥石と共に、台金上に溶射砥粒層が分散して形成されたもう一枚の新規有用なダイヤモンド砥石が同時に製造できる。

【図面の簡単な説明】

図面は本発明の実施例を示す。

【図1】抜き穴及び凹み穴を設けたダイヤモンド砥石の平面図である。

【図2】図1のA-A線断面図である。

【図3】製造方法の実施例を示す断面図である。

【図4】抜き穴を設けたダイヤモンド砥石の部分断面及び平面図である。

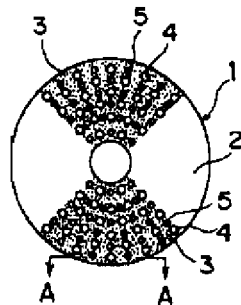
【図5】マスク溶射で製造されたダイヤモンド砥石の部分断面及び平面図である。

【図6】マスク溶射で製造されたダイヤモンド砥石の応用製品を示す断面図である。

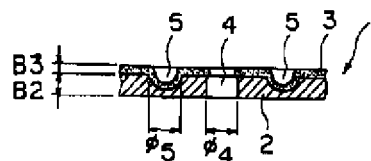
【符号の説明】

- 1 ダイヤモンド砥石
- 2 合金
- 3 溶射砥粒層
- 4 抜き穴
- 5 凹み穴
- 6 合金
- 7 溶射ガン
- 8 溶射混合粉
- 9 溶射砥粒層
- 10 ドレッシング層

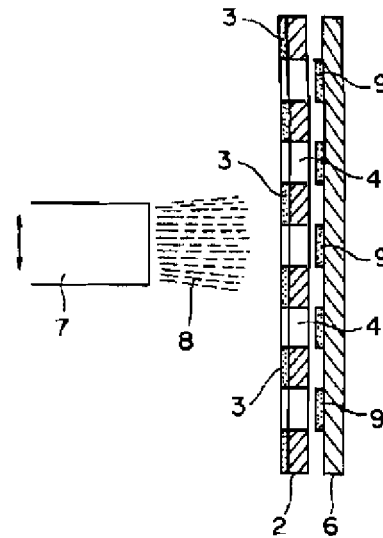
【図1】



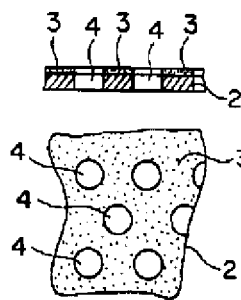
【図2】



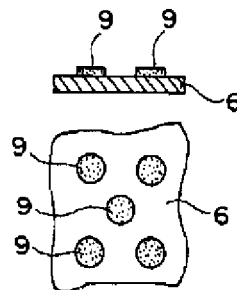
【図3】



【図4】



【図5】



【図6】

